

US EPA ARCHIVE DOCUMENT

2006 EPA Freshwater Spill Symposium
Portland, OR

Impacts of Hurricanes Katrina & Rita Upon Entergy's Electrical Transmission and Distribution Systems

Presented by:

Jeff Spillyards

Entergy Services, Inc.

Environmental Management



We're experienced at restoration...

- Andrew (Aug 1992) 250,000 customers
- Ice Storm (Feb 1994) 240,000 customers
- Georges (Sep 1998) 260,000 customers
- Dual Ice Storms (Dec 2000) 236,000 and 247,000
- Lili (Oct 2002) 243,000 customers
- Cindy (Jul 2005) 270,000 customers

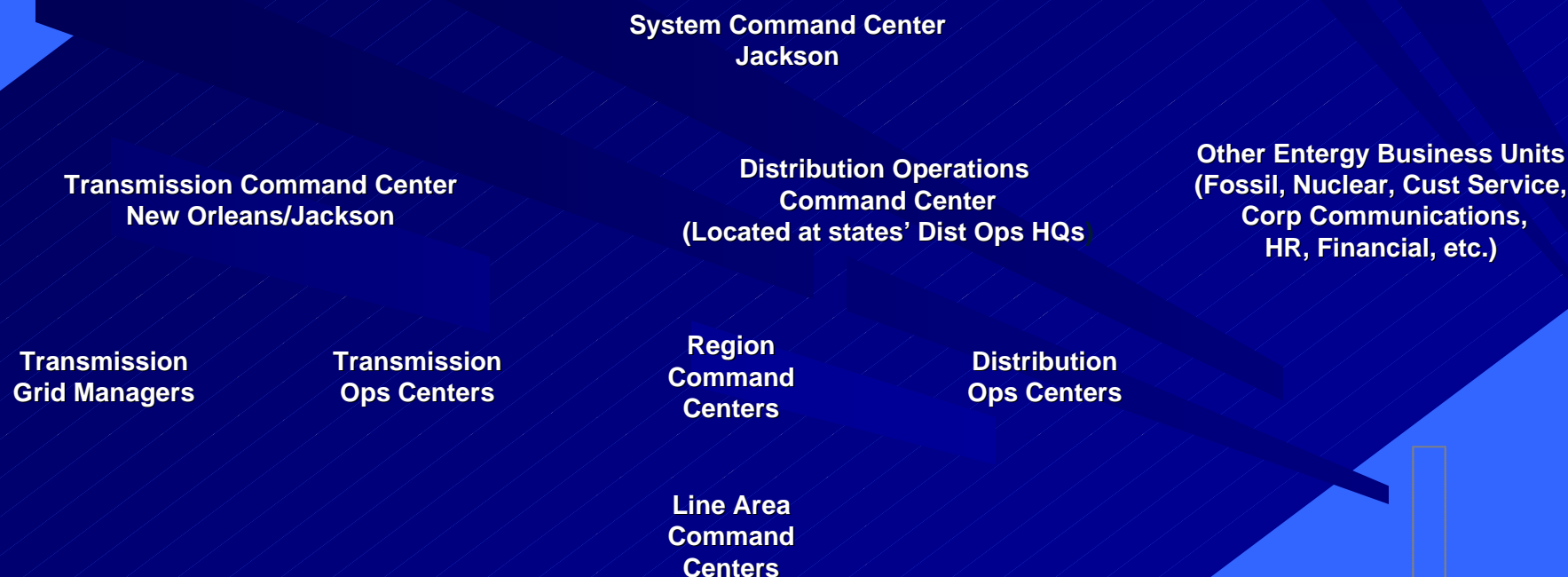


...are recognized at being good at it...

- Received the EEI outage response or outage assistance award every year for the last seven consecutive years
- Only utility to have won every year since the awards have been offered.

...utilizing a proven organizational approach...

System Outage Response Command Structure



...and we strive to continuously improve.

- Annual drills: *April 2005 drill scenario was Cat 4 impacting New Orleans with 20' flooding*
- Meetings with local officials & media (May 2005)
- Plan Improvements - Spring 2005:
 - upgraded evacuation process
 - internal "IE StormNet" launched
 - upgraded external web site
 - improved outage mapping applications
 - incorporated lessons of 2004 Florida storms

Environmental Management's responsibilities: development of environmental emergency response plan...

EM REST

ENTE EMERGE

Scope

This document details internal to the Environ or man-made disasters Distribution and Trans these are damages the responsibilities for the (DOA&TG) Support, a

Delineation of Respo

In the event of a major etc., which initiates the Management (EM) per affected will function in Restoration (EO&R) C for functioning as the c the on-scene environn health and the environ state and local regulat EO&R organizations.

The EM System Emer as liaison between the EO&R organization. T for supporting the EM as, coordination of TS DO Area or TG) EM st materials delivery, reg service that may requi

EM DOA&TG EO&R C

For storm events such communication betwee System EO&R coordin

this contact will be to communicate possible support requirements for these DOA's and TG's, such as (but not limited to), additional environmental emergency response contractor support; or additional EM personnel, in the event that evacuation of the EM DOA&TG EO&R coordinator is required. For events, such as tornadoes and ice storms that are less predictable, contact will be made by the EM DOA&TG EO&R Coordinator(s) to the EM System EO&R Coordinator as soon as practical after damage information on the area affected is available.

Interface of the EM DOA&TG EO&R Coordinator with the DOA and TG EO&R Organizations

It is essential that an assessment of the environmental damage within the area affected occur as soon as possible after the situation has stabilized. This information will be gathered by personnel doing the electrical assessment, if practical, and communicated to the EM DOA&TG EO&R Coordinator as soon as possible. This information will be required for communication to regulatory agencies, environmental emergency response contractors and to the EM System EO&R Coordinator. The EM DOA&TG EO&R Coordinator(s) may provide direct support to the DOA or Transmission Grid EO&R Organization in compiling this information, as necessary.

Interface between EM DOA&TG EO&R Coordinator and Out-of-DO-Area or T Grid EM Support

If the size and nature of the incident dictates that additional environmental emergency response contractors are needed, response contractors currently used in other DO Areas or T Grids may be mobilized to the affected area. This action will be coordinated by the EM System EO&R Coordinator. When "out-of-DO-area" contractors are utilized, the EM personnel that normally work with these contractors will accompany them to the affected area. It will be the responsibility of the EM DOA & TG EO&R Coordinator to coordinate where the EM support staff and their environmental response contractors will be utilized, once they arrive in the affected area.

EM EO&R Organization Standard of Support

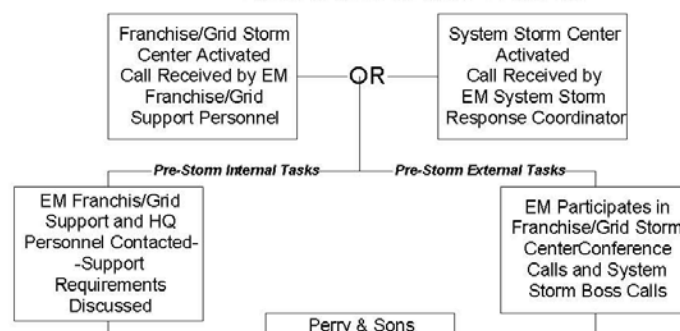
Environmental support actions pursuant to the EO&R will be conducted in accordance with all applicable federal, state and local regulations. Typically, regulatory agencies are preemptively notified when major storm incidents occur and are periodically updated as to the status of the recovery process and the magnitude of environmental damage sustained in the storm area.



Envi

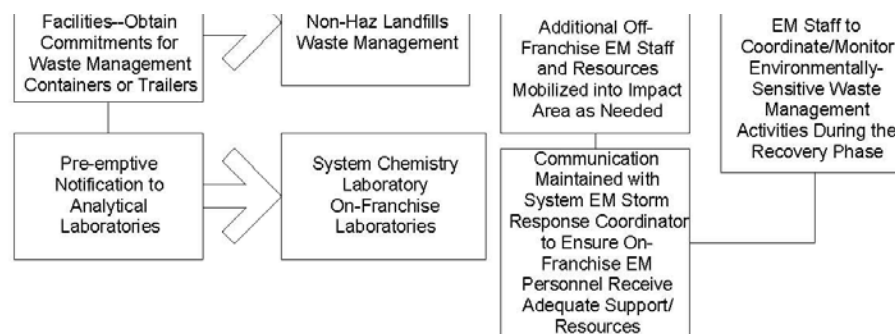
June 1999

EM STORM RESPONSE PROCESS



Emphasizes pre-storm notifications to:

- Environmental response contractors
- Material/equipment suppliers
- Salvage/disposal vendors
- Analytical laboratories
- Regulatory agencies



Entergy

Environmental development

2003 System Drill
DRAFT Message

PAGE __ of __

- ☐ Parallel and independent of main drill
- ☐ Parallel and dependent on the mail drill
- ☐ X Part of the mail drill

- ☐ Day One PM
- ☐ Day Two AM
- ☐ XDay Two PM

Message for Group: **AFFECTED NETWORK(S)**____
Scenario Time: POST LANDFALL_____

Message Statement

Crews are scheduled to restore service into a large petrochemical complex. This facility has sustained heavy damage to its chemical storage facility. Cleanup of released chemicals has not been completed.

Expected Actions to be observed

What actions need to be taken?

Explain/Demonstrate the process for contacting your Environmental Support representative.

representative.

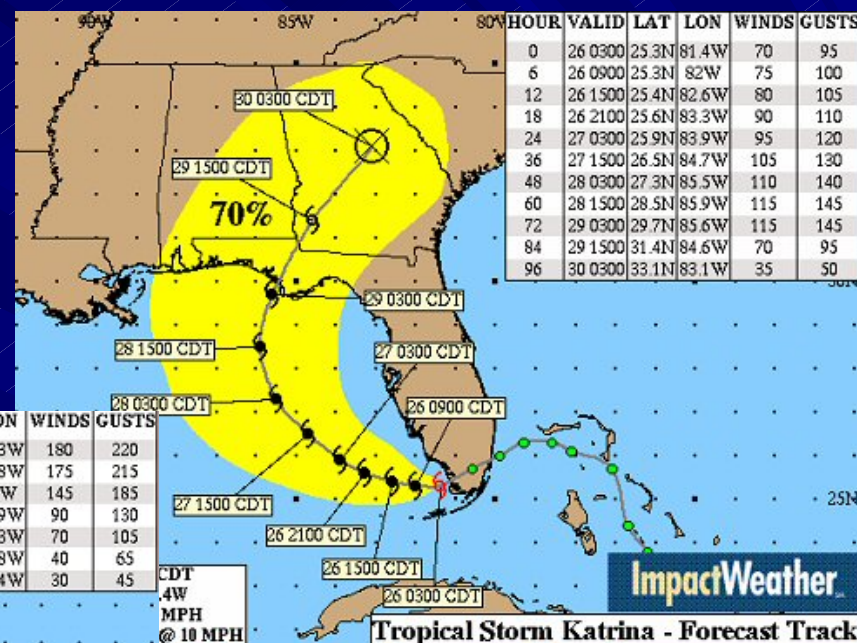
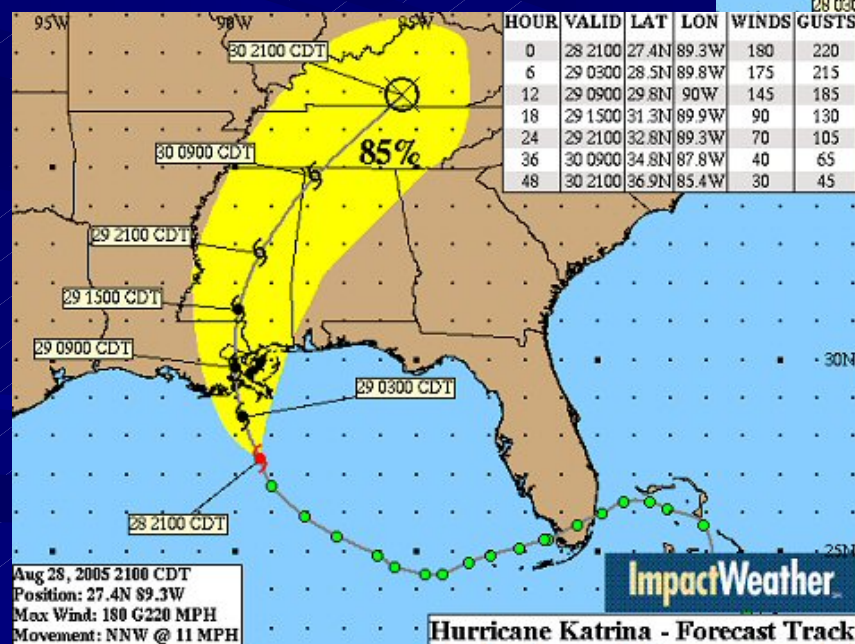
representative.



ergy

Katrina's projected path changed late

After crossing lower FL peninsula, originally projected to hit panhandle...



...but moved much further west.

Landfall



And then the breach...



Aftermath...



After



ergy



Unprecedented impact on Entergy 1.1 million customers out; severe flooding



800,000
Louisiana
outages

Katrina Storm surge approaches Michoud plant,
photo by Entergy Michoud plant manager Don
McCroskey



300,000
Mississippi
outages

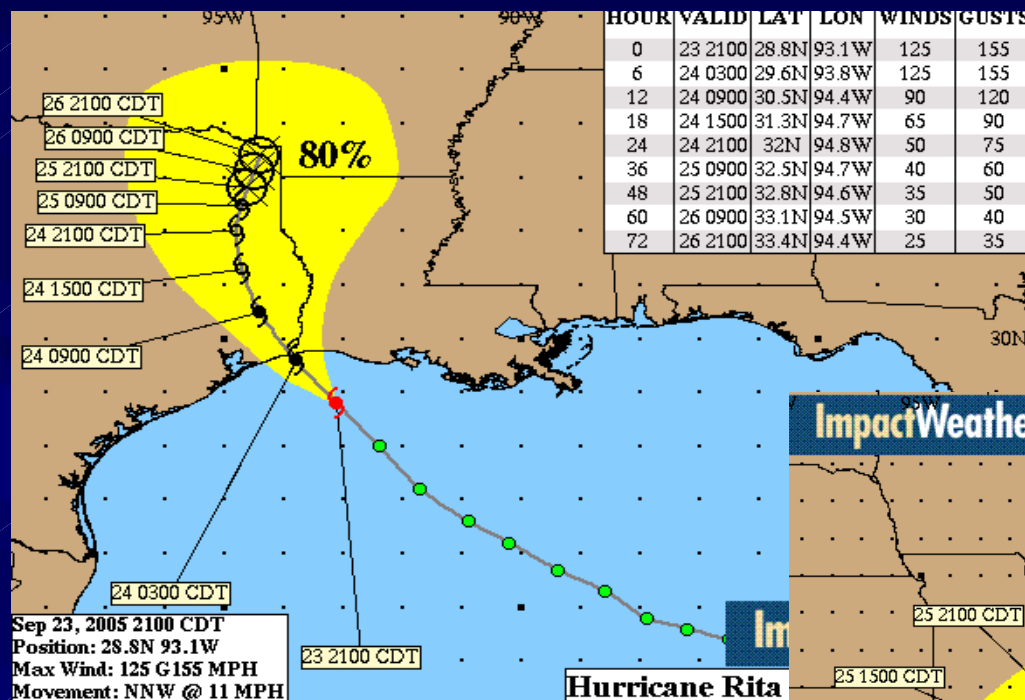
Entergy

Katrina's unique challenges...

- Corporate HQ evacuated
- Employees' homes destroyed
- Resources pre-dedicated to Florida
- Security threats in New Orleans
- Flooded gas facilities
- Contractors' bankruptcy fears
- Inoculations for workforce
- Severe substation flooding
- Communications knocked out
- Massive scale/logistics challenge
- Gasoline/Diesel shortages
- Inaccessibility
- DOE/DHS coordination & reporting

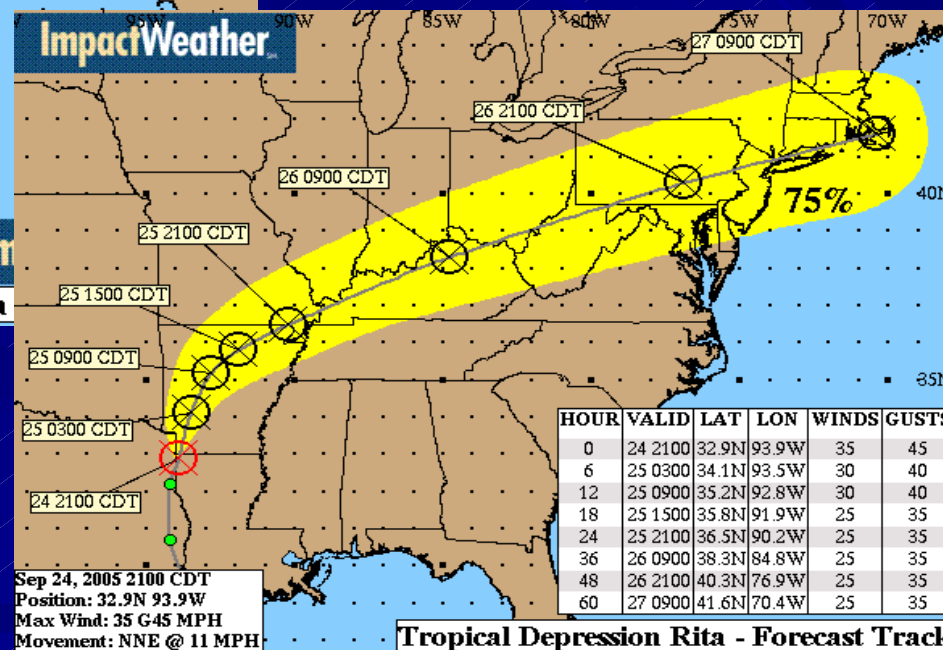


...were followed by Rita...



Initial landfall at TX/LA border as predicted...

...but tracked northeast after landfall, damaging all jurisdictions.



...and Rita's challenges.

- Second worst storm in company's history - 800,000 outages
- Massive damage to transmission system; generation plants damaged & isolated
- Three days of rolling blackouts for 142,000 Texas customers
- Exhausted workforce
- Another huge logistical challenge
- Material shortages following Katrina
- Continued coordination with DOE
- Texas PUC "Tiger Team"



Total system impacts

- “SAFETY TRUMPS SPEED”
- 1.87 million total electric customers
- 145,000 gas customers
- 28,900 Distribution poles replaced
- 522 Transmission lines out of service
- 715 Substations out of service
- 29 fossil/1 nuclear units shut down



Restoration—the environmental piece

Initial Challenges:

- Communication in impacted areas (all forms)
- Environmental response contractors domiciled in the impacted areas were displaced by the storms
- Domiciled response contractor equipment damaged by floodwater
- Analytical laboratories in the impacted areas were unavailable
- Fuel, lodging and meals for “out-of-area” response contractors sent to impacted areas

Potential Major Environmental Issues

- Threat of chemical and infectious agent exposure to workforce
- Damage to oil-filled electrical devices
 - Overhead and pad-mount distribution transformers
 - Substations
- Much of transmission line damage occurred in coastal marsh areas
 - Emergency permits required from USACE and Louisiana Dept. of Natural Resources Coastal Management Division
 - Some of the line damage resulted in power outages to Port Fourchon “LOOP”, and the Plantation and Colonial pipelines

A monumental support effort is launched

Recruited 13,000 tool workers and over 4500 support personnel.

More than 130 companies aided Entergy during Katrina and Rita restoration



What are the chemical exposure risks?

Safety is #1

—Always!



Subchapter B. Requirements for Emergency Notification

rule

§3915. Notification Requirements Discharges Which Cause I

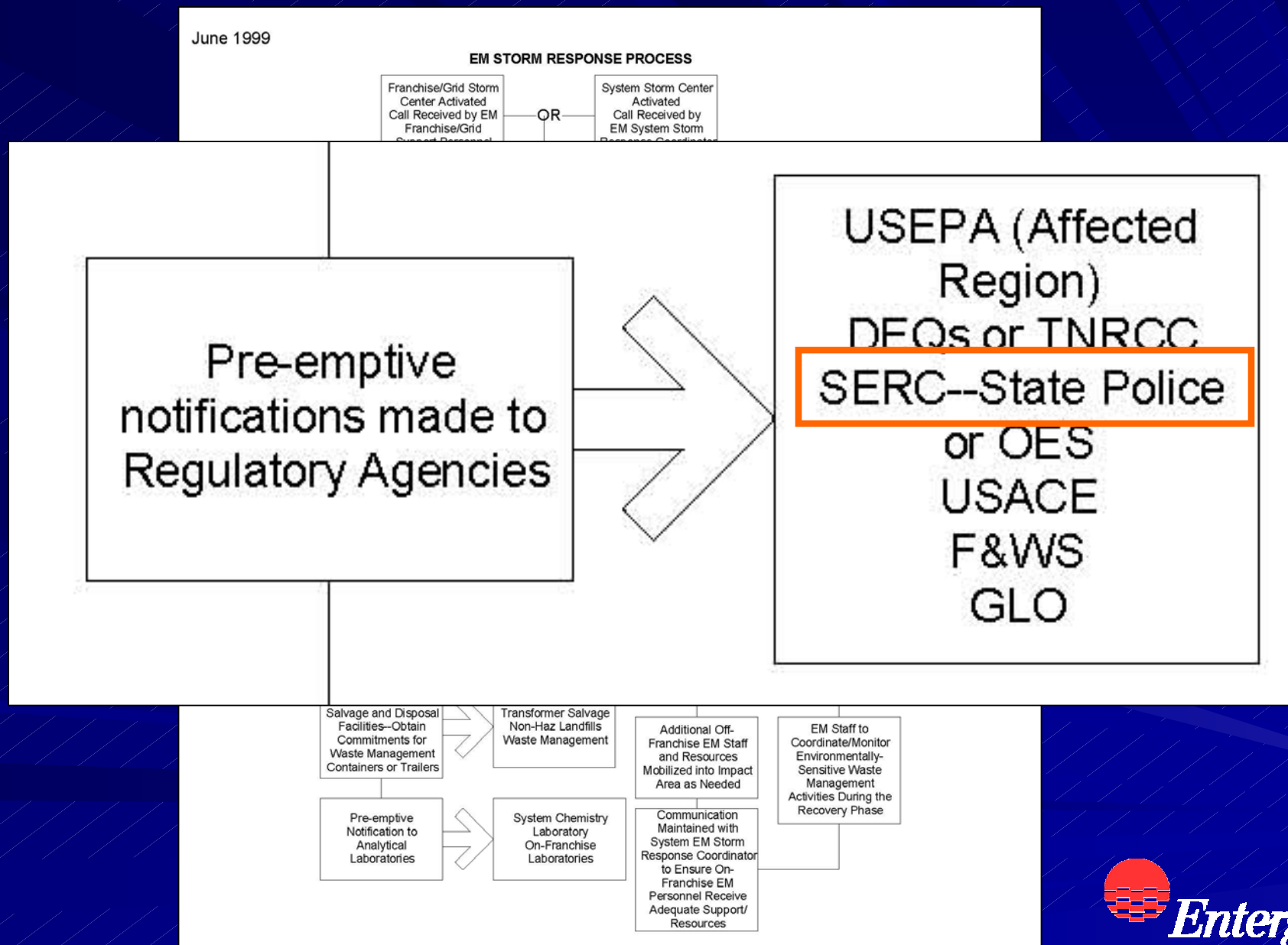
A. Notification to the DPS
Emergency Hazardous Materials Hot

1. In the event of an unauthor
cause an emergency condition, the di
hotline by telephone at (225) 9
accepted 24 hours a day) immediate
of time after taking prompt meas
nature, quantity, and potential off-s
considering the exigency of the cir
case later than **one hour** after learni
emergency condition is any c
reasonably be expected to endanger
the public, cause significant adver
water, or air environment, or ca
property.) Notification required by this Subsection will be
made regardless of the amount of the discharge.

Uniform Hazardous Materials Reporting Form

Incident # _____		Date / Time _____	
Courtesy Call () Reportable () Parish _____		Notified _____ / _____	
Caller's Name _____		Occurred _____ / _____	
Caller's Employer _____		Secured _____ / _____	
Caller's Phone # _____			
Incident Location _____		City _____	Range _____ Township _____ Section _____
Company _____	Name _____	Address _____	City _____
Chemical Involved _____	ID _____	EHS () Solid _____	Qty. _____ RQ _____
Hazard Class _____		Liquid _____	Gas _____
Did material go offsite? Yes _____ No _____	Release to: Land _____	Water _____	Air _____
Any off-site protective action? Yes _____ No _____	Road Closure _____	Shelter _____	Evacuation _____
Wind Direction _____	Fire: Y () N ()		
Wind Speed _____	Injuries: Y () N ()		
Temperature _____	Fatalities: Y () N ()		
Precipitation: None _____ Rain _____ Other _____			
Details: _____			

Entergy preemptive notification process...



Entergy preemptive notification process...

SPILLYARDS, JEFFREY

From: SPILLYARDS, JEFFREY
Sent: Tuesday, August 30, 2005 9:41 AM
To: 'LA State Police - Bob Hayes'
Cc: CALLE, FERNANDO J; HAYDEN, ROBERT M; BOURGEOIS, JASON
Subject: Entergy release reporting
Importance: High

Bob,

Regarding transformer spill reporting, we are attempting to satisfy DPS reporting requirements; however, as you can imagine, we're going to have a lot of stuff to report. To avoid bogging down the SPOC, do you prefer that we do daily verbal summaries until things get less chaotic? The same question applies to the follow-up written reports. Can we do daily spreadsheet summaries of activities as opposed to individual written reports? Also, I called last weekend and requested to be put on the DPS haz mat release notification e-mail list like you arranged for the last hurricane alert. Can you please follow-up on that request? This is going to be a fun one.

Thanks and take care---Jeff



SPILLYA	SPILLYA	SPILLYA	SPILLYA	SPILLYA	SPILLYARDS, JEFFREY
From: Sent: To: Subject: Importance:	From: Sent: To: Subject: Importance:	From: Sent: To: Subject: Importance:	From: Sent: To: Subject: Importance:	From: Sent: To: Subject: Importance:	From: TGuidry@dps.state.la.us Sent: Monday, September 12, 2005 7:30 AM To: singlepointof.contact@la.gov; hsees@dhh.la.gov; SPILLYARDS, JEFFREY Subject: Louisiana State Police Hazardous Material Incident # 05-06321 Importance: High
AND INCIDENT # HOTLINE 877-925-	I confirm about 3 h reports r -----Orig From: MHa Sent: Tue To: singl Subject: Importanc	AND NOT INCIDENT # HOTLINE 877-925-659	AND NOT INCIDENT # HOTLINE 877-925-659	AND NOT INCIDENT # HOTLINE 877-925-659	THIS INFORMATION IS FOR EMERGENCY RESPONSE PURPOSES AND NOT FOR PUBLIC DISTRIBUTION WITHOUT PRIOR STATE POLICE APPROVAL INCIDENT # 05-06321 HOTLINE 877-925-6595 / 225-925-6595 SOURCE: STATE POLICE HAZMAT
** (INI *****	AND N	** (INITIAL ***** HOTLINE NOT INCIDENT DI	** (INITIAL ***** HOTLINE NOT INCIDENT OC	** (INITIAL ***** HOTLINE NOT INCIDENT OC	** (INITIAL REPORT) DATE AND TIME ***** HOTLINE NOTIFIED: 09/12/05 07:26 INCIDENT DISCOVERED: 09/12/05 06:45
** (INITIAL RE *****		** (INITIAL ***** PARISH: St ADDRESS: H CITY: Dona	** (INITIAL ***** PARISH: As ADDRESS: 3 CITY: Dona	** (INITIAL ***** PARISH: St ADDRESS: 1 CITY: Norc	** (INITIAL REPORT) INCIDENT LOCATION ***** PARISH: Jefferson ADDRESS: UPS Building # 4, Airport West Access Road CITY: Kenner
** (INITIAL REPORT) DE *****		** (INITIAL ***** CALLER'S NA	** (INITIAL ***** CALLER'S NA CALLER'S AD 764 8611 /	** (INITIAL ***** CALLER'S NA CALLER'S AD 764 8611 /	** (INITIAL REPORT) CALLER INFORMATION ***** CALLER'S NAME: Jeff Spillyards CALLER'S ADDRESS OR EMPLOYER: Entergy CALLER'S PHONE NUMBER: 501-258-6531
** (INITIAL REPORT) DETAILS *****			** (INITIAL *****	** (INITIAL *****	** (INITIAL REPORT) RESPONSIBLE PARTY ***** NAME: Entergy MAILING ADDRESS: P O Box 551, TCBY 25 E, ATTN Jeff Spillyards CITY,STATE,ZIP: Little Rock, AR 72203
** (INITIAL REPORT) DETAILS *****					
** (INITIAL REPORT) DETAILS *****					
Hurricane Katrina damaged three pole-mounted transformers, causing them to lose their contents... Mineral oil spilled onto pavement... Cleanup will be completed this morning...					
***** INCIDENT PLANNED RELEASED RELEASE FI	** (INITI ***** CHEMICAL QTY REL EHS: Yes	** (INITIAL ***** INCIDENT CI DID MATERIA RELEASED TO ANY OFF-SIT Yes - RELEASE EFF FIRE: INJUR FATALI	CHEMICAL 1 QTY: ** (INITIAL ***** INCIDENT CI DID MATERIA RELEASED TO ANY OFF-SIT No RELEASE EFF FIRE:	** (INITIAL ***** INCIDENT CI PLANNED AND DID MATERIA RELEASED TO WHERE IS AI IF MONITORI ANY OFF-SIT No RELEASE EFF	** (INITIAL REPORT) RELEASE INFORMATION ***** INCIDENT CLASSIFICATION: Unusual Event DID MATERIAL GO OFFSITE? No RELEASED TO: Pavement ANY OFF-SITE PROTECTIVE ACTION? No RELEASE EFFECTS: FIRE: No INJURIES: No : FATALITIES: No :

In co

PROCLAMATION
BY THE
Governor of the State of Texas

ss...

...resulted in the timeframe for notification being expanded to 72 hours. Consequently, there was not a similar governmental process available for more “real-time” notifications for utilities engaged in infrastructure repair in Texas.

Attested by:

Roger Williams
ROGER WILLIAMS
Secretary of State





~6000 transformers sent to salvage vendor



~150 contract personnel engaged in oil spill response



~300 (?) oil spills requiring excavation

ELI Avenue C Substation—Low Voltage Oil Circuit Breaker



Substation: AVENUE C Component: HV OIL CIRCUIT BREAKER Sub Position: N0423
Oil Circuit Breaker Data...

Gallons
PerTank: 710.00

Number
ofTanks: ☐ 1 ☒ 3

Total
Gallons: 2,130.00

Ave. C--112.4(a) Report

22

and

ELI Grand Isle Substation—Auto Transformer and Regulators



Grand Isle--112.4(a)
Report

24

Report

Report

Report

Electrical infrastructure repair in coastal marsh...



Get Four
Free Issues

"COMPLETELY SHUT"

James," he says. "The
reliable estimate on
"unless something i

Placid was awarded
Ivan last year. It ho
72 million-barrel Ba
Aug. 29. SPR's four
open and undamaged

Refiners awaited re
Port, which remaine
imported crude, about 10% of U.S. weekly imports.

Louisiana coast, has its own power source.

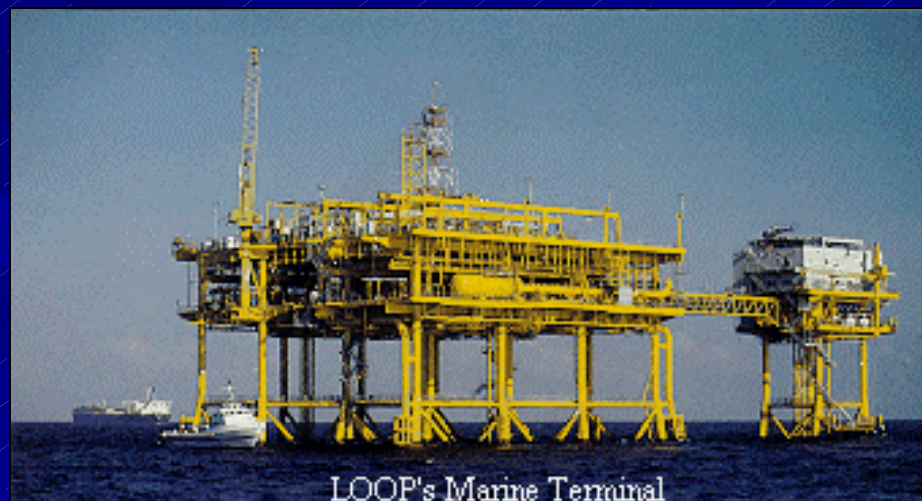
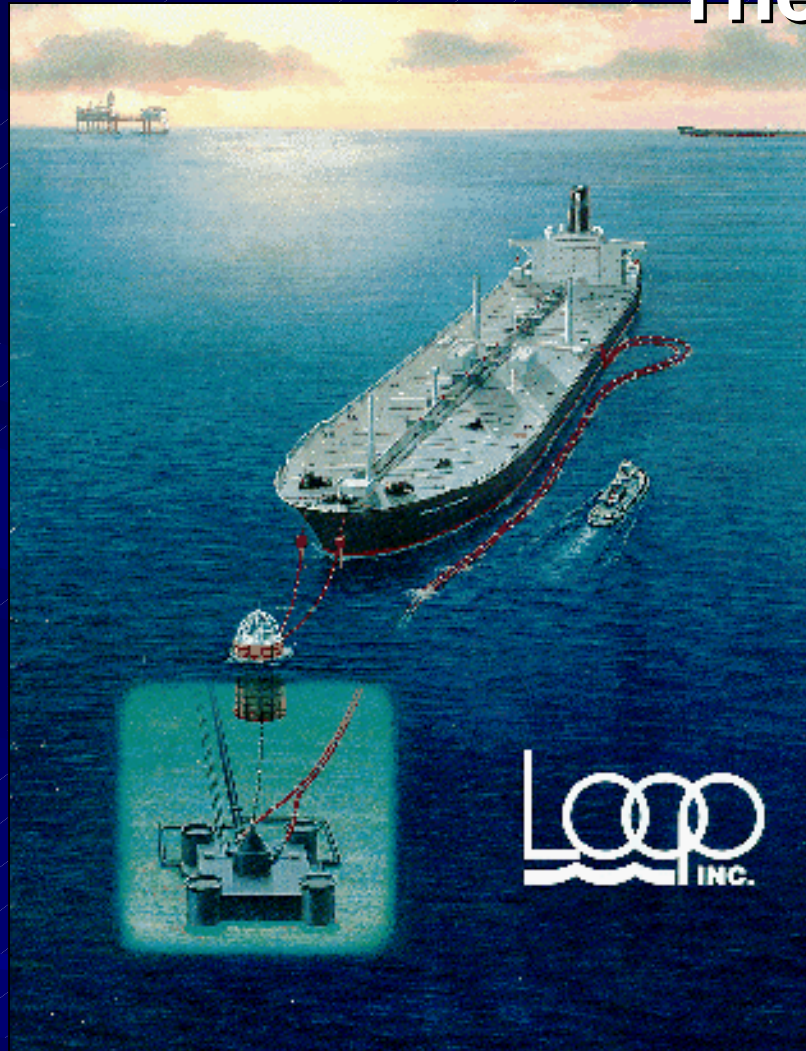
"Power is our biggest need... It shouldn't take us terribly long to get back once we get power," he says. LOOP could resume offloading vessels once power is restored "probably within a matter of hours."

FURTHER ASSESSMENT. A more extensive assessment of LOOP will be carried out shortly, the spokesman says. Additional testing of the offshore terminal can be done only once power is restored.

Power loss to the area surrounding the Capline and LOCAP crude pipelines were keeping both lines down on Aug. 30, according to a source close to the lines' operations. The Shell-operated ([RD](#)) 1.1 million b/d Capline was shut late Aug. 28. It's not clear when LOCAP, which connects Capline to LOOP, was shut.

LOCAP is operated by LOOP and has a capacity in excess of 1 million b/d. Capline carries crude from St. James, La., to Patoka, Ill. Shell and LOOP officials couldn't be reached for comment.

The "LOOP"



Tankers offload at LOOP by pumping crude oil through hoses connected to a Single Point Mooring (SPM) base. Some of these vessels require water depths of 85 feet--the water depth at each of LOOP's SPMs is 115 feet. Three SPMs are located 8,000 feet from the Marine Terminal. The SPMs are designed to handle ships up to 700,000 deadweight tons. The SPMs are 21 feet in diameter, 46 feet high and are anchored to a seabed base with an anchor chain. Mooring lines connect the bow of a tanker to the buoy and flexible hoses are used to transport crude oil from the tanker to a submarine pipeline. The buoy and hoses can rotate a full 360 degrees allowing the tanker to maintain a heading of least resistance to wind and waves.

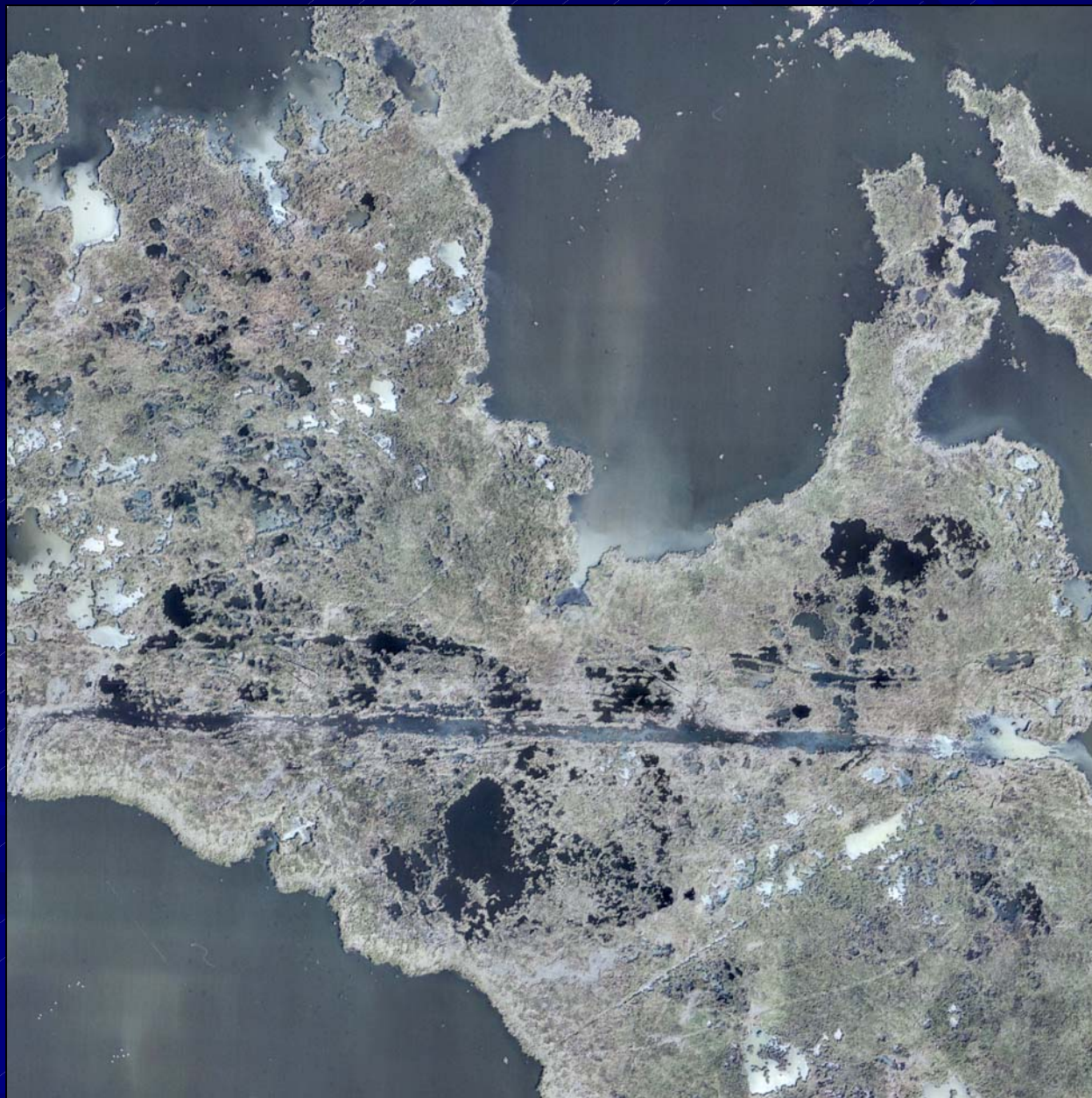
The "LOOP"



The “LOOP”—to get electrical power here...



...lines have to go through a lot of this...



and this.



Major dilemma:

- How does Entergy balance the need for expedited infrastructure repair with protection of the marsh?
- How does Entergy avoid being assessed mitigation responsibilities for impacts from the hurricane?

Entergy preemptive notification process...

SPILLYARDS, JEFFREY

From: SPILLYARDS, JEFFREY
Sent: Thursday, September 01, 2005 11:47 AM
To: 'Rocky Hinds'; raymond.b.gonzales@mvn02.usace.army.mil
Cc: David Evans--EPA Oil Program; LONGINOTTI, JAMES C; BARLOW, CHUCK D; SAVOYE, MARGARET JENKINS; HIMEL, EDMOND E; ZEMANEK, JOHN H; MCMANUS, LAURA S; LABORDE, MICHAEL J; SMITH, WALTER D; Bill Pittman; Honker.William@epamail.epa.gov
Subject: RE: Fourchon oil terminal power restoration
Importance: High

I understand. We are in the process of flying the lines to assess damage. In the marsh areas we are attempting to obtain pre-work video for photodocumentation. The major concern is, due to what can be extremely expensive on-site, in-kind mitigation for such work, that could add an additional, very significant, cost burden to what we're already up against if we expedite the work. Is a per acre "fee in-lieu of" mitigation an option here? That would allow for more accurate cost projections for the work. One of the concerns is defending, from the reconstruction cost recovery perspective, why we did, what we did. --Jeff

-----Original Message-----

From: Rocky Hinds [mailto:rockyh@dnr.state.la.us]
Sent: Thursday, September 01, 2005 11:29 AM
To: SPILLYARDS, JEFFREY; raymond.b.gonzales@mvn02.usace.army.mil
Cc: David Evans--EPA Oil Program; LONGINOTTI, JAMES C; BARLOW, CHUCK D; SAVOYE, MARGARET JENKINS; HIMEL, EDMOND E; ZEMANEK, JOHN H; MCMANUS, LAURA S; LABORDE, MICHAEL J; SMITH, WALTER D; Bill Pittman; Honker.William@epamail.epa.gov
Subject: RE: Fourchon oil terminal power restoration

I can give you authorization to do the work, but I can't waive state laws requiring mitigation for impacts to vegetated wetlands. We will assess the impacts following the work, rather than the usual up front determination. I'd encourage pre-/post-construction photos (not necessarily aials) to help document what was at the site. As we've discussed before, contractor sensitivity to the environment and the possible impacts caused by the equipment will be paramount.

r.

Entergy preemptive notification process...

-----Original Message-----

From: Rocky Hinds [mailto:rockyh@dnr.state.la.us]

Sent: Friday, September 02, 2005 2:17 PM

To: Guynes, Beth S MVK; Susan.Hampton@mvd02.usace.army.mil; TraciJohnson@dotd.louisiana.gov; info@lmoga.com; SPILLYARDS, JEFFREY; Michael Barbella; John Parker; Yarrow Etheredge; hammer@lsu.edu; John.F.Ettinger@MVN02.USACE.ARMY.MIL; Igremm@gremminger.com; Tre.Wharton@c-ka.com; (Mr.) Kelly Haggard; Aaron Bass; Andrew MacInnes; Anna Gray; Ben Summerlin; Brad DeHart; Cale LeBlanc; Claudia Schrull; Daniel.Bollich@c-ka.com; Dave Richard; David Lewis; Dennis Manuel; Donna Hollier; Faye Talbot; Greg Ryals; Gregory DuCote; Jeff DeBlieux; Jess Curole; Jill Mastrototaro; Jim Rives; John Mattingly; Jon Truxillo; Judge Edwards; Karl Morgan; Kasey Hebert; Kenneth Babin; Linda Pace; Lori Hodge; Marnie Winter; Mike Wascom; Pam Mattingly; pamelajc@team.com; Paul Clifton; Randy Moertle; Richard Greig; Rick Hartman; Rocky Hinds; Rosalind ; sglegal@lsu.edu; Shirley Rondeno; Terry Howey; Thomas August; tim allen; Vicki Murillo; Vickie Dufford

Subject: Special public notice for Hurricane Katrina

Hello ladies and gentlemen,

I've been asked to transmit this special public notice to you. Please feel free to distribute it to your co-workers and other interested parties as you see appropriate.

r.

Special Public Notice

The Secretary of the Department of Natural Resources has determined that damage done to the infrastructure in that part of the Louisiana Coastal Zone impacted by Hurricane Katrina and its aftermath has resulted in an emergency situation and that damage is covered by the emergency use provisions of the Rules and Procedure For Coastal Use Permits. Further, the Secretary has determined that due to fact that Hurricane Katrina has caused an impact of statewide significance, all emergency uses under the jurisdiction of the Louisiana Coastal Resources Program which are necessitated for response to Hurricane Katrina and its aftermath shall be considered to be uses of state concern

Because of the overwhelming destruction associated with Hurricane Katrina, the Department of Natural Resources, Coastal Management Division is temporarily modifying its usual emergency authorization procedures for storm related repair/restoration projects located east of and including Terrebonne Parish. This modification applies ONLY to those activities needed to restore infrastructure. The Department requests that emergency users be as environmentally sensitive as possible in conducting repair operations.

The Secretary is also authorizing those activities necessary to prevent additional damages. In the event that new construction is needed, an after-the-fact permit application might be required.

In the event that emergency repairs are needed, emergency users are authorized to commence the necessary work at the earliest opportunity. The Coastal Management Division reminds emergency users to provide the Department with notification via letter, email, or fax as soon as possible for documentation purposes. The notification should include the



Entergy preemptive notification process...

SPILLYARDS, JEFFREY

From: Hampton, Susan MVD [Susan.Hampton@mvd02.usace.army.mil]

Sent: Friday, September 02, 2005 5:25 PM

To: SPILLYARDS, JEFFREY

Subject: RE: Special public notice for Hurricane Katrina

Give me a call please – 601-634-5821. I am working on the emergency permit for local, State and Federal agencies and am considering adding utilities, etc. Thanks.

Susan P. Hampton

Vicksburg and Memphis District Support Team

Regulatory Community of Practice Leader

Environmental Compliance Community of Practice Leader

(601)634-5821 (601)634-5816 fax (601)831-5821 Cell



The result...



REPLY TO
ATTENTION OF:

DEPARTMENT OF THE ARMY
MISSISSIPPI VALLEY DIVISION, CORPS OF ENGINEERS
P.O. BOX 80
VICKSBURG, MISSISSIPPI 39181-0080
<http://www.mvd.usace.army.mil/>

CEMVD-PD-KM

3 September 2005

EMERGENCY PERMIT PROCEDURES FOR THE
STATES OF LOUISIANA AND MISSISSIPPI
WITHIN THE BOUNDARIES OF THE
MISSISSIPPI VALLEY DIVISION

New Orleans and Vicksburg Districts. This emergency procedure is also being extended to utility companies, electrical, phone, and pipelines, including natural gas distribution systems. In addition, road and railroad transportation projects are included.

3. By regulation, "an emergency" is defined as a situation which would result in an unacceptable hazard to life, a significant loss of property, or an immediate, unforeseen, and significant economic hardship if corrective action requiring a permit is not undertaken within a time period less than the normal time needed to process the application under standard procedures. These emergency procedures are being put in place to save lives and property and to restore some infrastructure.

4. This Emergency Permitting Procedure has been coordinated with the following Federal and state agencies:

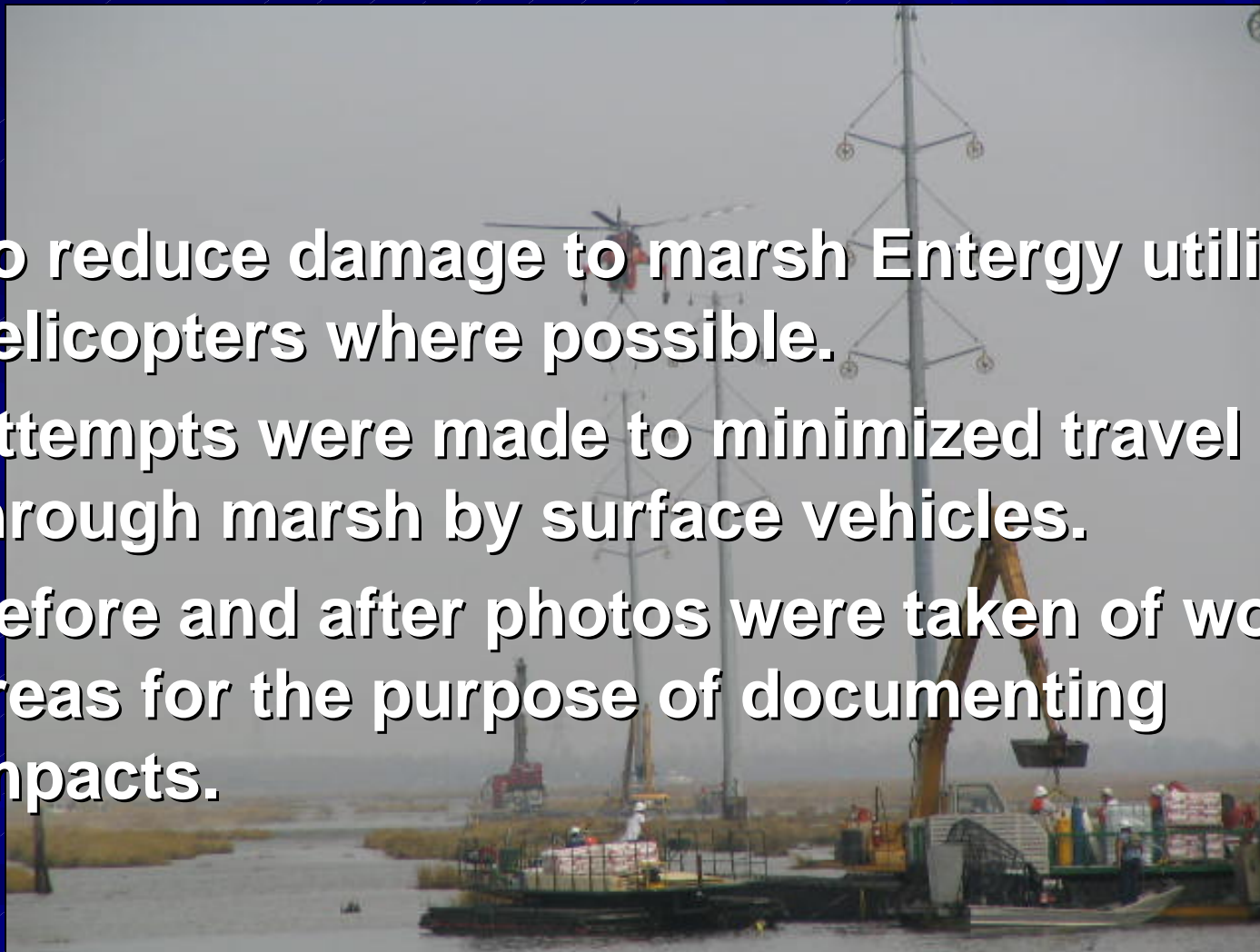
- a. EPA Regions IV and VI
- b. U.S. Fish and Wildlife Service, Lafayette Office
- c. FEMA
- d. Council on Environmental Quality

Printed on  Recycled Paper



Electrical infrastructure repair in coastal marsh...

- To reduce damage to marsh Entergy utilized helicopters where possible.
- Attempts were made to minimized travel through marsh by surface vehicles.
- Before and after photos were taken of work areas for the purpose of documenting impacts.





Equipment used--airboats



Equipment used—marsh bugies



OCT 2005

And a lot of very dedicated people...



tergy

Questions?

OCT 19 2005